

$$1. (2x + 1)^2 - (2x + 1)(2x - 1) + x + \frac{7}{2} > 3$$

$$4x^2 + 4x + 1 - (4x^2 - 1) + x + \frac{7}{2} - 3 > 0$$

$$4x^2 + 4x + 1 - 4x^2 + 1 + x + \frac{7}{2} - 3 > 0$$

$$10x > -5$$

$$x > -\frac{1}{2}$$

$$2. \frac{4}{3}(x - 2) + 12 > \frac{4}{3}x + \frac{8}{3}\left(3 - \frac{x}{2}\right) - \frac{1}{3}\left(2x + \frac{1}{2}\right)$$

$$\frac{4}{3}x - \frac{8}{3} + 12 > \frac{4}{3}x + 8 - \frac{4}{3}x - \frac{2}{3}x - \frac{1}{6}$$

$$8x - 16 + 72 > +48 - 4x - 1$$

$$12x + 9 > 0$$

$$x > -\frac{3}{4}$$

$$3. \begin{cases} 2 + 5x > 2x + 5 \\ 3(x - 2) < -x + 2 \\ 4(x - 3) + 3(3x + 1) > 3(x - 1) \end{cases}$$

$$\begin{cases} 3x > 3 \\ 3x - 6 < -x + 2 \\ 4x - 12 + 9x + 3 > 3x - 3 \end{cases}$$

$$\begin{cases} x > 1 \\ 4x - 8 < 0 \\ 10x - 6 > 0 \end{cases} \quad \begin{cases} x > 1 \\ x < 2 \\ x > \frac{3}{5} \end{cases}$$

$$1 < x < 2$$

$$4. \frac{x-1}{x-3} - \frac{x+1}{x+3} - \frac{2}{x^2-9} > 0$$

$$\frac{x-1}{x-3} - \frac{x+1}{x+3} - \frac{2}{(x-3)(x+3)} > 0$$

$$\frac{(x+3)(x-1) - (x+1)(x-3) - 2}{(x-3)(x+3)} > 0$$

$$\frac{x^2 + 2x - 3 - (x^2 - 2x - 3) - 2}{(x-3)(x+3)} > 0$$

$$\frac{x^2 + 2x - 3 - x^2 + 2x + 3 - 2}{(x-3)(x+3)} > 0$$

$$\frac{4x - 2}{(x-3)(x+3)} > 0$$

$$N > 0: \quad 4x - 2 > 0 \quad \Rightarrow \quad x > \frac{1}{2}$$

$$D_2 > 0: \quad x - 3 > 0 \quad \Rightarrow \quad x > 3$$

$$D_2 > 0: \quad x + 3 > 0 \quad \Rightarrow \quad x > -3$$

$$-3 < x < \frac{1}{2} \vee x > 3$$

$$5. \quad |x - 1| - |2x - 3| = 4$$

$$\begin{array}{r|l|l} 1 & \frac{3}{2} & \\ \hline -x + 1 & x - 1 & x - 1 \\ -2x + 3 & -2x + 3 & 2x - 3 \end{array}$$

$$\begin{cases} x < 1 \\ -x + 1 + 2x - 3 = 4 \end{cases}$$

$$\begin{cases} x < 1 \\ x = 6 \end{cases}$$

imp.

$$\begin{cases} 1 \leq x < \frac{3}{2} \\ x - 1 + 2x - 3 = 4 \end{cases}$$

$$\begin{cases} 1 \leq x < \frac{3}{2} \\ x = \frac{8}{3} \end{cases}$$

imp.

$$\begin{cases} x \geq \frac{3}{2} \\ x - 1 - 2x + 3 = 4 \end{cases}$$

$$\begin{cases} x \geq \frac{3}{2} \\ x = -2 \end{cases}$$

imp.

$$6. \quad \left| \frac{2x + 3}{x} \right| < 2$$

$$\begin{cases} \frac{2x + 3}{x} < 2 \\ \frac{2x + 3}{x} > -2 \end{cases}$$

$$\begin{cases} \frac{2x + 3 - 2x}{x} < 0 \\ \frac{2x + 3 + 2x}{x} > 0 \end{cases}$$

$$\begin{cases} \frac{3}{x} < 0 \\ \frac{4x + 3}{x} > 0 \end{cases}$$

$$A: x < 0$$

$$B: \quad N > 0; \quad 4x + 3 > 0 \quad \Rightarrow \quad x > -\frac{3}{4}$$

$$D > 0: \quad x > 0$$

$$\begin{cases} x < 0 \\ x < -\frac{3}{4} \vee x > 0 \end{cases}$$

$$x < -\frac{3}{4}$$

$$7. \quad |3x - 8| > 1$$

$$3x - 8 < -1 \quad \vee \quad 3x - 8 > 1$$

$$3x < 7 \quad \vee \quad 3x > 9$$

$$x < \frac{7}{3} \quad \vee \quad x > 3$$